REMARKS

This amendment is in response to the non-final Office Action of January 24, 2007 in which claims 1-5 and 9-16 were rejected and claims 6-8 objected to.

I. Amendments

In the attached amended set of claims, all reference signs in the claims have been cancelled, as requested by the examiner.

Furthermore, the following amendments have carried out, as indicated in the attached above amendment to the claims:

Claim 1 has been restricted with the features of claim 2.

It has been clarified in the added features that "different equations" means "different types of equations". Different types of equations are presented for instance in claims 5, 6 and 7.

Device claim 12 has been made independent from method claim 1. The specification has been amended at page 8 to state explicitly that the steps shown in the flowchart of Figure 1 are to be understood as corresponding to means or components for carrying out the method.

Dependent apparatus claims have been added based on method claims 3-11.

An independent apparatus claim 26 with means-plus-function terminology has been added.

II. Subject matter of the claims

In terms of new claim 1, the invention relates to a method for determining the position of a peak of a pulse in a signal received at a receiver. The method comprises the following features:

1. Taking samples of said received signal.

2. Selecting at least three samples,

    2.1 of which at least one has a signal strength exceeding a threshold value.

3. Determining the position of said pulse peak

    3.1 based on an interpolation of at least two of said selected samples,

        3.1.1 which at least two samples are selected based on the signal strengths of said at least three selected samples,

        3.1.2 which interpolation uses the signal strength of said at least two samples as input variables,

        3.1.3 wherein different types of equations for said interpolation are provided for different distributions of the signal strengths of said at least three selected samples.

The application aims at improving the accuracy of the determined position of a pulse peak.

The application further comprises claims 12 and 26 directed at a corresponding apparatus and a claim 16 directed at a cellular communication system comprising such an apparatus.

III. Cited prior art

US 6.118.808 A (Tiemann et al)

In a system presented in Figure 4, a threshold detector 3t monitors a correlation score and produces a "signal acquired" signal if the score is larger than a specified threshold. Upon receipt of a "signal acquired" signal, control 35 performs a simple peak-search and interpolation algorithm to find the best estimate of the code offset associated with the given code index and Doppler frequency under examination (col. 12, lines 13-20).

Figure 14 shows a section of the noiseless auto-correlation waveform for a C/A code P/N waveform. The auto-correlation value is very near zero for all offsets of magnitude greater than one chip width and is a triangle function for offsets between -1 and + 1 chip width (col. 17, lines 58-63).

In the waveform of Fig. 14, the peak time is usually not on the sampling grid. However, using the averaged auto-correlation values surrounding the peak time, the peak time can be estimated by interpolation. Various interpolation methods are known. One involves ordering the averaged autocorrelation samples according to increasing code offset and then searching for the two largest adjacent entries. The left entry and its left neighbor (B, A) together define a line, while the right entry and its right neighbor (C, D) together define another line. These two lines intersect and the intersection is the estimated correlation peak. This method requires solution of two simultaneous equations (col. 18, lines 45-64).

IV. Novelty and non-obviousness

Independent claim 1

The examiner was of the opinion that the subject matter of amended claim 1 is

not new in view of the Tiemann reference. However, at least the subject matter of amended claim 1 has neither been anticipated nor rendered obvious by the cited reference.

The Tiemann reference mentions that a plurality of interpolation methods are known to those skilled in the art, but the Tiemann reference presents explicitly only one method which will always use the same set of equations regardless of the distribution of the signal strengths, namely two equations which define intersecting lines. Feature 3.1.3 of claim 1, in contrast, requires that different types of equations are provided for different sample signal strengths distributions. Thus, at least feature 3.1.3 of claim 1 is not disclosed by the cited reference, and the subject matter of new claim 1 is novel in view of the cited reference.

The subject matter of claims 1 has also not been rendered obvious to a skilled person.

Proceeding from the Tiemann reference, it is an objective problem to be solved to (further) improve the accuracy of the determined position of a pulse peak.

This is achieved according to claim 1 by providing different types of equations for different signal strengths distributions for the interpolation (feature 3.1.3). The most appropriate equation can then be selected flexibly. The distribution of signal strengths does not depend only on the pulse shape, but also e.g. on the sampling instances and on possibly overlapping pulses, as can be seen in Figures 3-5 of the application (see also page 6, 1st paragraph of the description). Providing different kinds of equations (see e.g. the different equations on pages 9, 11 and 13 or in claims 5-7) for different signal strengths distributions thus enables a more accurate determination of the position of a peak pulse, even in case of multi-path conditions as shown e.g. in Figure 4.

The Tiemann reference, in contrast, deals only with a peak detection in pure, undistorted signals. The phenomenon of multi-path conditions is not considered at all

in these documents.

Proceeding from the Tiemann reference, a person skilled in the art will therefore have no motivation in the first place to consider the use of equations depending on the distribution of signal strengths. In the Tiemann reference, there is not even a suggestion that different methods may use different types of equations depending on the types of received signals. Much less is there a hint that a plurality of equations can be provided within a single method for different signal strengths distributions, where the actual signal strengths distribution can obviously only be determined when the signal is being processed.

On the whole, even though the Examiner has not applied an obviousness rejection, it becomes apparent that the subject matter of claim 1 cannot be considered to be rendered obvious by the cited document either.

<u>Independent claims 12 and 16</u>

As the apparatus of claim 12 and the system of claim 16 are configured to realize the method of claim 1, the same comments apply as for claim 1. Therefore, also the subject matter of claims 12 and 16 has to be considered to be novel and non-obvious.

It has further to be noted that an implementation in a cellular communication system in accordance with claim 16 is not mentioned in the cited prior art document.

Withdrawal of the novelty rejection of claims 1-5 and 9-16 is requested.

The objections and rejections of the Office Action of January 24, 2007 having been obviated by amendment or shown to be inapplicable, withdrawal thereof is requested and passage of claims 1 and 2-26 to issue is earnestly solicited.

It is not believed that there is any need for an extension of time but if this is incorrect, the Commissioner is authorized to deduct the correct extension of time fee from our Deposit Account No. 23-0442 and to consider this paper as a petition therefor.

Likewise, we have enclosed herewith our check for $250.00 for the six additional dependent claims (and taking into account that dependent claim 2 was cancelled) but if we have overlooked the need for a larger fee or if we paid more than required, the Commissioner is requested to deduct the shortfall from or credit the overpayment to our Deposit Account No. 23-0442.

Respectfully submitted,

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